

104-1101

# Office Memorandum • UNITED STATES GOVERNMENT

TO : Chief, Engineering Division/OC

DATE: 24 March 1954

FROM : Chief, Administration and Inspection Branch/PD/LO

SUBJECT: Contract No. (RD) XG-578, Task Order No. 5

XG-578  
Task 5

1. Attached is copy of the Certificate of Compliance with the subject contract Patent Provisions and copy of the Abstract of Invention Disclosure for a "Hydraulic Motor/Pump."

2. The contractor has indicated his intention to eventually file this patent and has recommended that the security classification to be assigned to this invention is "Unclassified." It is requested that your office advise as to the true classification that should be assigned to this invention so that in the event that the classification is other than "Unclassified," the Contracting Officer can notify the contractor regarding limitations on filing due to security.

3. Since it is necessary to complete negotiations on final settlement prior to 30 June 1954, an early reply is requested.



4 Attachments

LO/PD/A&amp;IB/CM:se (24 March 1954)

## Distribution:

- Orig & 1 - Addressee
- 1 - (RD) XG-578
- 1 - Chrono
- 1 - Vital Records
- 1 - Patent File with enclosure

50X1

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**CONFIDENTIAL**

**SECRET**

**CERTIFICATE OF COMPLIANCE**  
**WITH CONTRACT PATENT PROVISIONS**  
**(Partial)**

Date MAR 4- 1954Contract No: (RD)XG-578

(For the period from 30 June 1952  
 through 15 August 1953)

Contractor: 

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The undersigned contractor hereby certifies that a complete examination has been made of all records, including notebooks and reports, maintained and prepared in the performance of the work of Contract (RD)XG-578 (which work is also known as Task 5 of  which was performed during the period from 30 June 1952 through 15 August 1953.

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The appended schedule forming a part of this certificate identifies, by the inventor, title, and date of disclosure, all invention disclosures which are submitted herewith in compliance with the terms of the above contract. The appended schedule further designates those inventions concerning which the contractor elects to file patent applications.

Other than the inventions reported in the appended schedule and attached disclosures, there have been no inventions made or actually reduced to practice in the performance of Task 2 of this contract, during the period from 30 June 1952 through 15 August 1953.

By 

By

Approved: \_\_\_\_\_

Approved: \_\_\_\_\_

**SECRET**

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SCHEDULE OF INVENTION DISCLOSURES SUBMITTED

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Date MAR 4- 1954

Contract No: (RD)XC-578

Contractor :

There are no inventions to report under Task 5 of Contract (RD)XC-578  
for the period from 30 June 1952 through 18 August 1953, except as follows:

NUMBER	TITLE	INVENTORS	DATE DISCLOSED	WRA TO FILE	CLASSI- FICATION
1.	Hydraulic Motor/Pump	<span style="border: 1px solid black; display: inline-block; width: 180px; height: 55px; vertical-align: middle;"></span>	23 Feb.1954	Yes	Uncl.

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The last column represents the Contractor's recommendation to the  
Sponsor regarding the security classification to be assigned to the invention  
disclosure.

Brief Title: "Hydraulic Motor/Pump" 50X1  
Inventor's Name (s): \_\_\_\_\_  
Project No. \_\_\_\_\_ of Contract No. \_\_\_\_\_ 50X1  
Approximate date of Conception of Novel idea: 23 February 1953  
Date of Preparation of the Abstract: 23 February 1954

1. Brief Abstract of what is accomplished by invention:

This invention relates to improvements in design and construction of hydraulic motors and/or pumps. Although this disclosure is devoted specifically to a motor, it is applicable in all respects to a pump as well.

The invention may best be understood by explaining the construction of the hydraulic motor shown in the attached drawing. The housing consists of three metal sections called the cover, the spacer, and the body. Mounted at the center of the unit is a rotor which consists of two sections doveled and screwed together. The major piece consists of a shaft, a flange machined integrally with the shaft, and a projection of the flange called the rotor body. The inner and outer surfaces of the rotor body are machined concentrically with the axis of the rotor shaft, with the outside diameter somewhat smaller than that of the flange. The rotor body contains four radial slots 90° apart which are closed by a washer-shaped rotor plate, the second section of the rotor. The rotor plate has an outside diameter equal to that of the flange while its inside diameter coincides with that of the rotor body. Slidably mounted in the slots defined by the rotor body and plate are vanes having a length equal to the radial distance between the inner surfaces of the rotor body and plate and the outer surfaces of the rotor plate and flange.

The motor cover and body contain radial-thrust ball bearings in which the rotor shaft revolves. The spacer contains two concentric recesses which provide running spaces for the rotor flange and plate and a third eccentric recess forming the outer guide for the vanes. The inner vane guide is a cylindrical projection from the inner surface of the motor body made concentric with the outer vane guide. The vanes are thus mechanically actuated out from and in toward the center of the unit by the space between the vane guides once each revolution of the rotor.

Inlet and outlet ports are milled at the center of the outer vane guide and admit hydraulic fluid radially to the space between the vanes. Clearance between the rotor plate and flange and the motor housing is kept to a minimum to provide good sealing between the high and low pressure sides in the vicinity of the input port. However, the pressure must be kept low at the running seal where the output shaft passes through the cover in order that an effective seal can be obtained without excessive friction. In order to keep the pressure low at this point, the cover and body are recessed and vented to the low pressure port. This venting also reduces axial thrust on the rotor due to unequal pressure built up on each side.

Nylon has been found to be the most suitable vane material because of its extremely good wearing properties and low coefficient of friction. Deflection is so small as to not offer a source of difficulty.

Theoretically, the motor is not a constant-speed device because the vane guides are not concentric with the rotor body. However, the inertia of the rotating pieces keeps the variations in speed too small to be of concern. A true constant-speed motor

**Inventor's Name (s):**

1. Brief Abstract of what is accomplished by invention:

The high-speed hydraulic motor represents a unit which lends itself readily to production processes. A minimum of close tolerance dimensions will be maintained, and these should present no particular problem to a qualified manufacturer of hydraulic equipment. In production, some superficial changes such as making the motor casing in five pieces, one for each flat surface, may be found convenient. Such a change would reduce the number of depth tolerances which are generally a little harder to maintain than diametral or thickness tolerances. The number and nature of the modifications will depend chiefly on the preference of the manufacturer.

Brief Title: "Hydraulic Motor/Pump"

SECRET

Inventor's Name (s):

50X1

2. Brief Summary of advantages of this idea over what has been done before:

The hydraulic motor is capable of running at high speeds. The method of mechanically actuating the vanes by an eccentric race results in positive vane positioning at all speeds and pressures and low bearing pressure at the tips of the vanes. By moving the vanes in a circular path to eliminate abrupt changes in radial vane motion, vibration and noise are hardly noticeable.

3. Brief Summary of what is new here:

The following items of novelty are written with respect to a hydraulic motor but apply equally to a pump or a motor-pump.

a. In a hydraulic motor, the method of mechanically actuating the vanes by running them between concentric guide surfaces which are eccentric with the axis of the rotor is thought to be novel.

b. A hydraulic motor in which all recesses are circular in shape whereby high rotational speed produces no noticeable vibration is considered to be a novel device.

c. A hydraulic motor in which the shaft seal is maintained at a low operating pressure by scavenging to the low pressure side is considered novel.

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4. Pertinent References to notebooks, publications, and other written matter:

a. Drawing attached (no number)

Signed

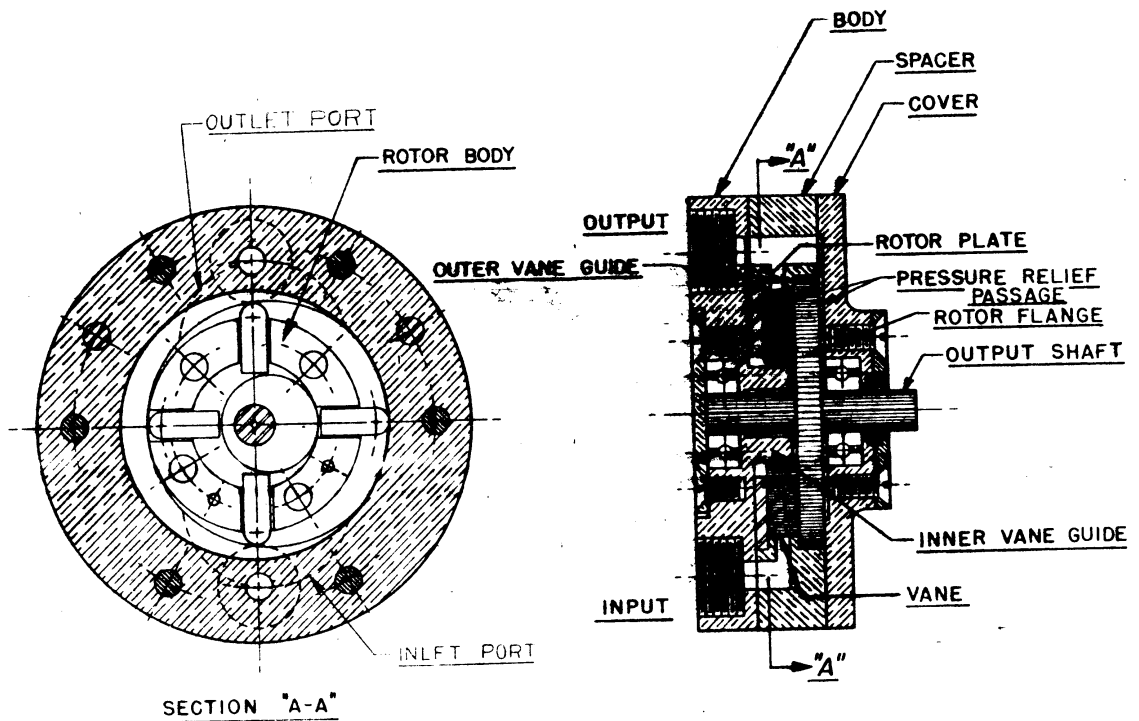
Attach whatever drawings or other sheets are necessary to graphically complete the description of the above idea. All addendum sheets must be signed, witnessed and dated.

FORM

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EXAMINED BY:   
 Date 3/1/54   
 Date 3/1/54   
 Witness   
 Witness

3/1/54



HYDRAULIC MOTOR

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